THESIS/REPORTS
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409 Federal Bldg.
Victoria, B.C.

US
FS
IFRES
ntp Misc
1957 22
Oct (2)

(NOT FOR PUBLICATION)

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
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FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Ogden, Utah

October, 1957

ENGELMANN SPRUCE BEETLE ACTIVITY IN THE NORTHERN ROCKY MOUNTAIN REGION 1957

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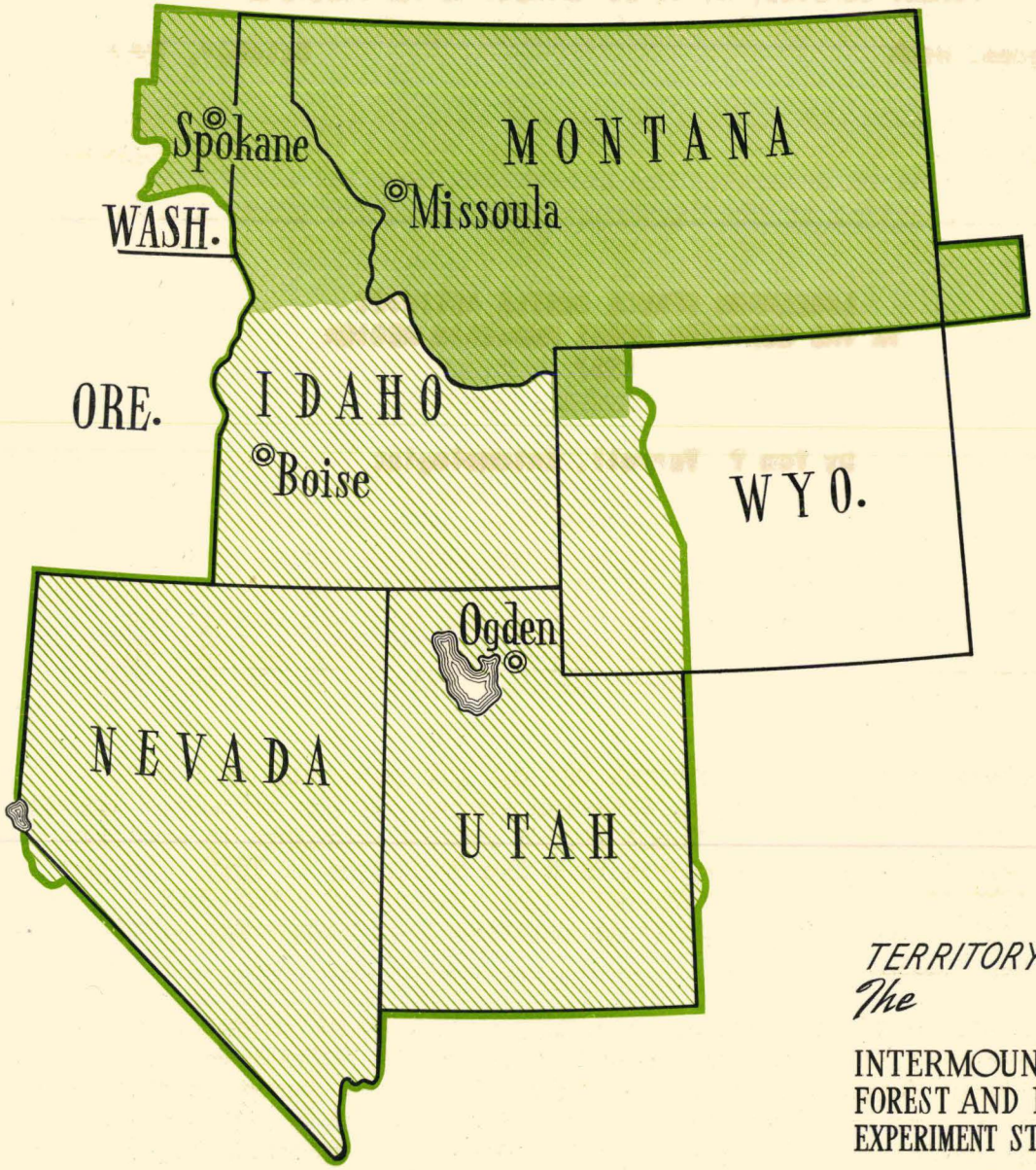
The AREA COVERED BY THIS REPORT



TERRITORY OF.. The

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

The MISSOULA FOREST INSECT LABORATORY is a field unit of the Intermountain Forest and Range Experiment Station at Ogden, Utah. The Laboratory conducts forest insect research, surveys forest insect outbreaks, and gives technical advice on cooperative insect control programs in Montana, northwestern South Dakota, northwestern Wyoming, northern Idaho, and northeastern Washington.

The functions are conducted in the remaining station territory by staff entomologists at Ogden, and Boise, Idaho.

CANADA
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ENGELMANN SPRUCE BEETLE ACTIVITY IN THE NORTHERN ROCKY MOUNTAIN REGION 1957

By Tom T. Terrell, Entomologist

This report presents the results of surveys made in several Engelmann spruce stands on the Kootenai National Forest during 1957. The purpose of the surveys was to determine the extent and cause of persistent localized infestations of the Engelmann spruce beetle[1/] that were reported from a number of logging areas. These infestations are the remnants of an outbreak of Engelmann spruce beetle that developed in the Northern Rocky Mountain Region in windthrown spruce timber during 1950 and 1951. The windfalls resulted from a windstorm of hurricane force that occurred in the fall of 1949 and caused great losses of timber in northern Idaho and Northwestern Montana.

In 1952 the spruce beetle spread from the windfalls into standing spruce timber throughout most of the spruce type. During the period 1952 through 1956, more than 2.5 billion feet b.m. of spruce timber was attacked by the spruce beetle. The outbreak pattern during this period was one of a massive infestation in 1952, a further increase in severity in 1953, which was followed by a decline in the outbreak during the successive years. Many pure spruce stands were totally depleted by the beetle epidemic, leaving some spruce volume surviving in the marginal stands of mixed timber.

Control efforts against the outbreak did not get under way on a very large scale until 1953. Logging infested timber was the principal action taken against the outbreak although direct control measures by application of insecticide were undertaken in a few drainages in 1953. During 1954 and 1955 the logging of infested timber increased extensively. A substantial part of the infested or beetle-killed timber has subsequently been logged.

During the course of this outbreak surveys were made of infested areas by the Laboratory to follow the normal trend of the infestation and by the national forests to determine volume losses by forest compartments. Laboratory surveys were made in selected areas felt to be representative of outbreak conditions throughout the Northern Rocky Mountain Region. To determine the normal, undisturbed course of the outbreak, survey areas were used where neither direct control measures nor logging was expected. For the most part they were in remote drainages, wilderness areas and Glacier National Park. The National Forests cruised their spruce compartments annually to estimate the beetle damage for administrative purposes.

1/ Dendroctonus engelmanni Hopk.

Normal trend data from Laboratory surveys compared with loss estimates from the forests show that the losses were not as great where logging was undertaken as they were in unlogged stands. Data are summarized in table 1 where an "index of change" is given to show the normal trend. Estimates of annual loss for all the national forest compartments and a comparative index based on these losses is included.

Laboratory trend surveys were ended in 1956 because many of the areas originally selected had been logged despite their remoteness and because infestation in the remaining blocks had returned to a near normal status. The decline in the outbreak was evident throughout the Region: in many forest compartments no infestations were reported in 1956. In contrast to the generally favorable trend, however, reports were received of localized outbreaks ("hot spots") from some logging areas.

To determine the seriousness and, if possible, the cause of these outbreaks, surveys were made by the Laboratory in several typical compartments on the Kootenai National Forest in 1957. Kottenai Forest compartments were surveyed in this study because they offered a wide selection of areas having various degrees of logging and because most of the so-called "hot spot" infestations were reported from there in 1956.

Compartments surveyed were, for the most part, areas in which the more serious outbreaks were reported in 1956. Data obtained from the surveys shows a considerable amount of infestation in some areas (table 2). Logging has been in progress in all areas listed except the Red Top drainage. No valid data on trees attacked in 1956 were obtained in the logging areas because nearly all of the attacked trees were removed during the fall and winter of 1956-1957. In the unlogged Red Top drainage a record of 1956 attacked trees showed an infestation of 8.8 percent in 1956. In the large Pinkham Creek drainage the spruce type was divided into blocks to determine the variability of the infestation between different parts of the drainage. Only block E showed a significant difference.

Although the cause of the continued losses from beetle attacks in these logging areas is difficult to determine, several factors are thought to contribute to the maintenance of a beetle population. From a general inspection, it appears evident that the greatest losses are in stands that were only partially cut: where an attempt was made to remove only infested trees. There is sufficient host material in the form of green stumps, green tops, and injured trees in such areas to provide a source of beetles and sufficient shade from "leave" trees to permit brood development. In some clearcut blocks the same problem exists around the margins of the cuttings.

Spruce beetle infestation may persist for several years in these logging areas where there is sufficient host type. Care in logging, and perhaps blocking out patches of infested timber and exposing logging debris to the sun may very possibly reduce these infestations to a minimum.

SUMMARY

Engelmann spruce beetle infestations continue to be a problem in some spruce stands in the Northern Rocky Mountain Region. Losses from current beetle activity, however, are but a fraction of the damage caused by this beetle in 1952-1953.

In most areas the current infestations are found where logging has been actively undertaken and where a fair residual volume of spruce type remains. While logging has apparently been effectual in reducing or retarding beetle infestations in such areas, a highly susceptible pure spruce type remains under conditions favorable to beetle development.

Losses from spruce beetle attack in such areas may persist for several years.

CONTROL RECOMMENDATIONS

Localized outbreaks of Engelmann spruce beetle will undoubtedly be a problem in logging areas for several years. Logging is recommended as a practical means of controlling these localized outbreaks. It is thought that better control would be effected if, wherever possible, the timber patches harboring the infested trees are clear-cut to permit the logging debris to be exposed to the sun and to minimize the logging damage to the residual timber.

Table 1.--Trend of the Engelmann spruce beetle outbreak by years in the Northern Rocky Mountain Region and the estimated spruce volume killed on national forest land

	1952	1953	1954	1955	1956
Index of change on undisturbed areas [1/]	1.0	1.9	1.6	0.6	0.2
Volume killed on national forests MM ft. b.m.	617	881	590	332	165
Index based on volume killed on national forests [1/]	1.0	1.4	0.9	0.5	0.3

1/ 1.0 equals the volume of beetle-attacked spruce in 1952.

Table 2.--Percentage of residual spruce stand infested by Engelmann spruce beetle in drainages surveyed on the Kootenai National Forest 1957

Drainage	Engelmann Spruce Trees Sampled			
	Uninfested trees	Beetle Infested	Total	Percent Inf. 1957
CARIBOU CREEK				
Drainage total & average	434	38	472	8.0
PINKHAM CREEK				
Block A	2591	266	2857	9.3
Block B	1720	130	1850	7.0
Block C	530	63	593	10.6
Block D	1666	85	1751	5.1
Block E	1063	6	1069	.6
Drainage total & average	7570	550	8120 ~~9120~~	6.8% ~~6.0~~
WEST-SIDE YAAK RIVER DRAINAGES				
Davis Creek	2135	10	2145	.4
Upper W. Fk. Yaak River	144	0	144	.0
Midge Creek	994	21	1015	2.1
Red Top Creek	528	38	566	6.7*
Spread Creek	1817	10	1827	.5
Drainage total & average	5618	79	5697	1.4

* 8.8% in 1956.